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## Lecture on Inflammation

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Lecture 1<sup>st</sup> Nov. 8<sup>th</sup> 1830 - Monday

Inflammation is an abstract term designating a collection of symptoms. <sup>It was</sup> ~~not~~ restricted by Celsus & the four leading symptoms "Calor, dolor, tumor, rubor" - but has since been employed by many surgeons more indefinitely to designate almost every kind of morbid action.

This term was never intended to designate the cause, or the essential nature of the disease, but only to denote the fact that a certain train of symptoms exists in a given case. It is like all other abstract terms, & should be understood in the same way as Newton intended to be understood by his use of the term gravitation. Many surgeons, however, have misconceived the meaning of this word & have bewildered themselves with vain inquiries into the essential nature of inflammation, - imitating the <sup>metaphysical</sup> disquisitions of the old school - men respecting the occult causes of things.

Fever is another abstract term which is employed to designate a class of diseases of the whole system or ~~constitution~~, in the same manner that Inflammation is employed to designate the symptoms of disease in a part of the system. Inflammation is the local disease. Fever is the constitutional disease which results from the influence of injurious causes acting upon the system.

Irritation is another term employed <sup>by the term</sup> ~~much~~ by surgeons is meant every inordinate or morbid effect resulting from the action of exciting causes upon the system or parts of the system. A part is said to be irritable or in a state of irritability, when the stimuli to which accustomed in health produce morbid effects. <sup>as. R. pharynx</sup>



We must be careful not to confound these terms with the physiological acception of them. Haller & other writers employ them to designate the power which the muscles possess of being thrown into action by stimulus locally applied to them.)

A part may be in a state of irritation and still not be inflamed; but inflammation cannot exist without some degree of irritation. In inflammation there is something superadded, therefore, to mere irritation. I would say that irritation is confined to the nerves, while inflammation involves the bloodvessels of the affected part.

Irritation is both local & constitutional:  
—the first is analogous to inflammation, the 2<sup>d</sup> to fever.

Injuries affect the system differently in cases of individuals possessing different constitutions.

In a healthy temperament where there is a perfect equilibrium in all the functions there will be less <sup>immediate</sup> disturbance & a more salutary train of consequences during the subsequent efforts at restoration.

In a sanguine temperament there will be more vascular excitement & higher inflammation.

In a nervous temperament more irritation & irregular excitement.

In a bilious temperament more depression, & <sup>unsuccessful</sup> efforts at reparation. &c. &c.

But the principal difference in the <sup>immediacy</sup> effect of injuries arises from the degrees of violence with which the body has been afflicted. Slight wounds & injuries disturb the constitution but very little, if at



## Constitutional Shock & Irritation.

The majority of those who die from the effects of burns, injuries, & operations do not survive long enough for either fever or inflammation to be set up: - they are destroyed, therefore, either by the immediate impression of the injury upon the system (the shock) or from the subsequent irritation.

"In fatal cases of 'Burn' the state of prostration is contemporaneous with the infliction of the injury."

In the fatal cases of complicated injury (as fractures, operations for recent injuries &c) there is some variety as regards the accession of the symptoms of prostration. Four days is the extreme period to which life is usually prolonged. The result in such cases is altogether independent of inflammation.

Inflammation ensuing upon injuries & operations precedes these symptoms setting in at a variable but considerably later period - the inflammation standing in the relation of exciting cause.

In hemorrhage & colligative suppuration the symptoms of prostration take a measure strictly according to the exciting cause - more rapid if from hemorrhage or its consequences, erysipelas or gangrene; slower if from wasting suppuration.



Mr. Travers gives the following epitome of his two forms of prostration,

1. 1<sup>st</sup> Prostration pure. Prostration without reaction is marked by universal pallor & contraction of surface, shuddering, very small & rapid pulse, astoundment of the mental faculties, generally a dilated pupil, shortened respiration, dryness of the tongue & fauces; indistinctness, and at length cessation of the pulse at the wrist, stupor, oppressed & noisy respiration, coldness of the feet & hands, involuntary twitchings, relaxation of the sphincters, confirmed insensibility, stertor, & death.

2. 2<sup>d</sup> Mixed. Prostration with excitement is marked by the signs of anguish & stupor or drowsiness in the commencement, to which after a variable interval succeed rigor, precordial anxiety, restlessness, fæstitation; a rapid & bounding pulse, oppressed respiration with frequent attempts to sigh, flushed countenance, contracted pupil, dry heat of the skin, parching thirst, rejection of liquids taken into the stomach, incoherence & wildness of expression, sometimes amounting to fierce delirium. This state is succeeded by exhaustion marked by somnolency, a profuse chilly & clammy sweat, a haggard & livid aspect, a small irregular or fluttering pulse, innumably rapid, panting respiration, passing convulsions, hiccup, and subsiding the stupor & stertor of apoplexy, and death.



Sometimes there follows a state of continued languor & faintness, with coldness & sleepiness verging on deliquium, the pulse & breathing almost imperceptible terminated by convulsions.

At other times M. J. has seen alternating with a state of coma, convulsive paroxysms, in which the features undergo the contortion & fixedness of epilepsy, vehement maniacal ravings, & impotent attempts to rise from bed, with an incessant muttering & repetition of broken phrases relating to the occupation of the individual & terminating in exhaustion.

But these symptoms of prostration do not always terminate fatally. They may gradually give place to a partial & defective reaction, protracting the life, but faintly improving the prospect of restoration, which remains doubtful for several days in inception: - or, on the contrary, an efficient & healthy degree of reaction may be quickly established, consequent upon symptoms threatening the most unfavorable issue.

I have been in the habit of classifying the different cases of Shocks which I have seen under the following three heads

- 1<sup>st</sup> Overwhelming Shock - fatal, or very slowly recovered from by an imperfect & feeble reaction.
- 2<sup>d</sup> Temporary Shock, followed by speedy reaction
- 3<sup>d</sup> Insidious Shock - - - - -



Some patients after exceedingly severe injuries complain of no pain, or irritation, exhibit no disturbance of pulse, stomach, or respiration, but languish along from 24 to 36 or even 50 or 60 hours and then fall into complete prostration & spascelus.

e.g. Mrs. Schwa at Hullmeville - with a bad compound dislocation of an ankle & fracture of the fibula. Her tongue continued clean, her pulse soft & natural, her sensibility natural, her mind undisturbed, bowels & kidneys free, skin moist & cool, leg & foot easy & comfortable, and yet the limb mortified on the 4<sup>th</sup> day & she expired on the 6<sup>th</sup>. Her pulse became very rapid & her cheeks hot & flushed before death. She also began to shew a countenance of surprise & alarm on waking from her short slumbers the day before she died.

This presents a fair case of insidious shock, and it proved so to the attendants, for they suspected nothing wrong until the limb began to mortify.

Mr. Scoville's case was another. He jumped out of the 3<sup>rd</sup> story window of Congress Hall & met with the same accident. He immediately after walked about on the broken & inverted foot without experiencing any pain or flinching. Under active stimuli he struggled along several weeks & finally recovered.

### Irritation, constitutional & local.

Differences between constitutional & febrile and between local irritation & inflammation.

In irritation there is <sup>no</sup> regular or continued train of actions.  
"It is every thing by turns & nothing long."



— Severe wounds are attended with some degree of prostration or faintness (& that too independent of all loss of blood) from which the patient will very soon recover. The pulse <sup>will</sup> be indistinct & tremulous at first, the skin cold, the sensibilities enfeebled, & the mind clouded, and these symptoms may continue for a considerable period of time until the reaction takes place. The pulse then rises to its natural standard, the skin become warm & flushed, & the sensibilities are restored, and the patient remains in a state of health, completely shaking, until the fever of inflammation supervenes.

This is a fair illustration of what I would call the Temporary Shock.

But very severe injuries sometimes destroy the powers of life immediately, or at least ~~they~~ so far overcome them as to sink the patient into an exceedingly protracted & dangerous state. This I call the Overwhelming Shock. I beg you to observe that this may take place without any injury upon the head or any other vital organ. It often occurs from the passage of a heavy body over one of the extremities. When this proves speedily fatal & the patient evinces no symptoms of reaction it is a pure case of overwhelming shock. But when reaction does eventually take place it approaches to the nature of a temporary shock. These two kinds of shock verge into each other by undistinguishable shades; so that in a great number of cases you will have some which <sup>you</sup> will find it difficult to classify under one or the other head.



But there is still another ~~constitutional~~ effect  
resulting immediately from severe injuries & which I  
would particularly call your attention. It is not uncommon  
for a compound dislocation of the ankle joint to be  
followed by a period of apparent tranquillity & entire  
absence of irritation in all parts of the body, & still  
for a sudden sinking to take place on the third or fourth  
day, which will terminate in mortification or death.  
This I call the Insidious Shock.

Very few appear to be aware of this case, & most  
Physicians predict favourably until the fatal  
change occurs. The pulse remains natural, the tongue  
<sup>moist</sup> soft & clean; the skin cool & perspiring, and the  
mind tranquil. This is very like the most fatal  
cases of yellow fever described by Rush. The  
ship has foundered on a rock or shoal in the  
other kinds of Shock; but in this the cable  
is parted & the rudder lost. The first appearance  
of danger that is observed by most Physicians  
is a treacherous or <sup>troubled</sup> ~~dull~~ countenance, and a  
hurried pulse. The strokes of the pulse are often 160  
in a minute, open, full & thrilling like fine sand  
leaping under the fingers. This is a fair sample of the soap  
bubble pulse, or gaseous pulse. Partial sweats then break  
out & the tongue will quiver, & the hands tremble. Labial  
turdianum supervenes, - then wandering of the mind,  
feeble convulsions & death.

Besides these <sup>more</sup> immediate consequences of  
severe injuries there occur a variety of secondary  
symptoms in different cases, which deserve our  
particular attention in this disquisition. The first of



there is irritability of the stomach, which often attends the period of reaction from the temporary kind of shock. This is often salutary and is a favorable indication in most cases. But when it is excessive it must be checked by appropriate remedies.

The second of the secondary class of symptoms is delirium. When this immediately follows the injury it is very unfavorable, especially if it continue a length of time. But when it occurs subsequently to the reaction it is not of itself unfavorable - but merely so in connexion with the other symptoms. When the state of the system is remediable the delirium connected with it will be relieved also by remedial means - & vice versa.

~~Spasms~~ & Chorea - also occur very frequently - and are highly dangerous when they occur in a sinking state of the system. But they are remediable when they occur in connexion with a state of the system which is under the control of remedies.

Pain occurs at all times, except in the dangerous stages of shock; and is modified in its course & intensity by a great variety of circumstances. In general a moderate degree of pain is favorable; but very severe & protracted pain often proves fatal.

Morbid vigilance is another occasional consequence of wound, & becomes very injurious if protracted long. This depends altogether, however, upon its connexion with other symptoms.

Jaundice, Suppression of urine, & dyspnoea are very unfavorable symptoms in all cases especially the two latter.



The first indication for treatment which strikes the mind of most practitioners would seem to be the prevention of inflammation, - no matter what may be the immediate result of the injury or the nature of the secondary symptoms. Bloodletting is resorted to in the prostrate & faint condition of the system after almost all accidents and the vulgar always cry out for it on the spot.

The proper plan, however, is, in all cases, to treat for the existing symptoms, and to let the powers of the system have an opportunity of developing themselves.

In the temporary shock it will not often be necessary to stimulate. Give the patient fresh air, carry into a ~~warm~~ room of a proper temperature & chafe his hands & feet or embrocate the skin with hot spirits &c and in a few minutes reaction will occur. But do not mistake the excitement of reaction for inflammatory action. If it be excessive at first, it will soon subside of itself; at all events cool applications to the surface & cool drink will very soon subdue it.

In severe & overwhelming cases of shock it will be necessary to stimulate actively. Brandy, toddy, or some other alcoholic mixture is best. External warmth & frictions are also excellent, but they must be laid aside as soon as reaction supervenes.

In the insidious shock we can do nothing - I have never seen any treatment serviceable.



The irritability of the Stomach which <sup>often</sup> occurs at the moment of reaction is generally temporary & will require no treatment. The moment the contents are rejected the irritability ceases. But when the irritability is of longer duration remedy will be required.

In case it be accompanied with symptoms of hepatic derangement, or of foul contents an emetic dose of Ipec. followed by warm diluents will be proper.

If it be attended with tenderness of the epigastrium, or heat & pain there, leeches will do best, & should often be followed by a blister.

In ordinary cases a sinapism on that region will do much good; & when the feet are cold the same application should be made at the ankles.

If there be heat on the surface cooling drinks in very small doses are proper — especially Soda water, — and effervescing mixture. If on the contrary there be chilliness & a sense of coldness at the stomach cordial drinks will be best — such as clove tea, cinnamon tea, — brandy & water &c. Lime water & milk &c. — But the great secret is to give them in very small quantities.

When the irritability is extreme solid opium &c. — & when there is no violation of the secretions belomel & opium pills.

Pain is to be treated altogether according to the accompanying symptoms, as they exhibit the state of the system. When the pulse is excited, the skin hot, &c. depletion is the proper course; — & Antimonials. Taster emetic is the best of all emetics in such cases.

When the skin is cool & perspiring, the pulse weak &c, the preparations of Opium are best — & these should be chosen according to circumstances.



— Effusions are to be considered very much in the same light with fevers — sometimes depletion & antimonials; — at other times opiates are best.

Inflammation generally occurs between 36 & 48 <sup>60</sup> hours; and becomes more or less severe according to the severity of the injury & other circumstances. If the injury be very slight, or a mere contusion, it is possible that a resolution of the inflammation may be effected in its commencement. Even in very slight cuts a reunion may be effected without any evident progress of inflammatory action — and this we call reunion by the first intention —

If the wound be a little more severe the inflammation cannot be thus checked, but passes on to effect an exhalation of the coagulating lymph of the blood into the cellular cavities & <sup>upon</sup> the surfaces of the wound — and this is denominated adhesive inflammation, or the adhesive stage of inflammation. When the inflammation progresses no further it is said to terminate in adhesion. The deposition of lymph produces some degree of induration & tumescence, & serves the purpose of circumscribing the disease. The cells of the cellular tissue being blocked up all infiltration of air & fluid is prevented & the stimulus of imperfection is removed. That portion of the lymph which is deposited between the lips of a wound becomes the bond of union by first agglutinating the surfaces together, & afterwards becoming organized so as allow of a communication of vessels & nerves between the separated surfaces. — After the wound has become consolidated the lymph becomes absorbed & the induration disappears —



In still more severe wounds the operation cannot be effected by this process, & the inflammation has, therefore, & heat & keep on to a higher grade. The pain becomes more severe, a throbbing is complained of, chill & flushes alternately pervade the system & violent symptomatic fever results. The pulse varies between 90 & 112, & the secretions are generally suspended. In a short time pus begins to be discharged from the wound - which is often preceded by a bloody serous discharge. Pus is a secretion, not the result of putrefaction or erosion; & always relieving the inflammatory action. It is only when the secretion is confined that it fails of relieving the distressing sensations of the patient, and then the pain of ulceration supervenes. If the pus be allowed to escape its secretion is always accompanied by <sup>except in the mucous membrane</sup> granulation. Granulation is also a secretion & not a mere proliferation of cellular tissue as Bristol supposed. It is effected by the exhalation of small drops of coag<sup>d</sup> lymph, which speedily become organized by the shooting out of vessels into them. This can be <sup>often</sup> satisfactorily demonstrated by the appearance of ulcers. A pellicle of soft white substance (looking precisely like a flake of buffy coat from the top of a coagulum in a bowl) is often seen on the surface of an ulcer. When you pull it this it will be found to adhere at points into which the subjacent vessels have extended themselves. This is, therefore, a layer of coagulating lymph secreted over all the surface of the ulcer & imperfectly organized. As soon as these granulations have formed a layer over the surface they begin to contract toward the centre & <sup>they</sup> close up the wound. Their contraction is precisely like the contraction of a coagulum, or rather like the contraction of the muscles. When the wound is thus filled & cicatrization occurs over the surface.



Authors describe various other terminations of inflammation, <sup>some of</sup> which however have for their object the restoration of wounds. - 1. The exhalation of serum only occurs in debilitated constitution, or in long times & is a dropsical symptom. 2. The hemorrhage is an accidental circumstance which operates precisely like local bloodletting. 3. Induration or schirrhosis, is merely the result of adhesive inflammation remaining unabsorbed, and which is particularly apt to occur in the glands. 4. Mortification is also a termination of inflammation according to most writers - but it rather results from antecedent cause, which the inflammation proves unable to counteract.

The inflammation of which all the above terminations are only so many stages is called phlegmonous, or the healthy infl.<sup>n</sup> Phlegmonous from the former ideas of phlogiston the matter of fire; and healthy <sup>either</sup> because it occurs in healthy constitution or has for its object the restoration of health.

But there are other kinds of inflammation which do not have this tendency to restore parts - they on the contrary tend to their destruction. Pathologists have therefore denominated them morbid inflammation. The first of these which I will mention is Erysipelas - so called on account of its tendency to extend over a large surface or to draw it into the disease. I divide this disease into three species. 1<sup>st</sup> Simple, 2<sup>d</sup> phlegmonous; 3<sup>d</sup> oedematous.



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